Leopoldina
Nationale Akademie
der Wissenschaften

Curriculum Vitae Professor Dr Edvard Moser

Name: **Edvard Ingjald Moser**
Date of birth: **27 April 1962**

Research Priorities: Neuroscience, mechanism of spatial orientation, natural navigation system, grid cells, speed cells

Edvard Moser is a neuroscientist. He is known for his work on spatial orientation and spatial memory. Together with May-Britt Moser he discovered a type of brain cell (grid cells) that enables precise orientation in space. This made it possible to demonstrate thinking capacity at a neuronal level for the first time. For the discovery of grid cells, Edvard Moser and May-Britt Moser received the Nobel Prize in Physiology or Medicine in 2014, together with John O'Keefe.

Academic and Professional Career

since 2013	Founding Vice Director, Centre for Algorithms in the Cortex, Kavli Institute for Systems Neuroscience (KISN), Norwegian University of Science and Technology (NTNU), Trondheim, Norway
2013 - 2022	Founding Vice Director, Centre for Neural Computation and Co-Director, Kavli Institute for Systems Neuroscience (KISN), Norwegian University of Science and Technology (NTNU), Trondheim, Norway
since 2018	Einstein Visiting Fellow, Berlin Institute of Health (BIH), Berlin, Germany
since 2007	Founding Director, KISN, Trondheim, Norway
2002 - 2012	Founding Director, Centre for the Biology of Memory, NTNU, Trondheim, Norway
since 1998	Professor of Neuroscience, Faculty of Medicine and Health Sciences, NTNU, Trondheim, Norway
1996 - 1998	Associate Professor, Biological Psychology, NTNU, Trondheim, Norway

1994 - 1996	Postdoctoral Fellow, University of Edinburgh, Edinburgh and University College London (UCL), London, UK
1995	PhD in Neurophysiology, University of Oslo (UiO), Oslo, Norway
1991 - 1995	Research Associate, UiO, Oslo, Norway
1984 - 1990	Degree in Mathematics, Statistics, Neurobiology and Psychology, UiO, Oslo, Norway

Functions in Scientific Societies and Committees

since 2020	International Scientific Advisory Board, Chinese Institute of Brain Research, Beijing, China
since 2019	International Steering Committee, Edmond and Lily Safra Center for Brain Science, Hebrew University, Jerusalem, Israel
since 2015	Foreign Scientific Member, Max Planck Institute of Neurobiology, Planegg, Germany
since 2013	Member, Board of Directors, Centre of Excellence, Ministry of Education and Research, Norway
2013 - 2016	Member, Scientific Advisory Board, Ernst Strüngmann Forum, Frankfurt am Main, Germany
2012 - 2016	Member, Advisory Board, Society for Neuroscience, Washington D.C., USA
	Member, Selection Panel, Starting Grants, European Research Council (ERC)
2012 - 2013	Member, Scientific Advisory Board, Picower Center for Learning and Memory, Massachusetts Institute for Technology (MIT), Cambridge, USA
2011 - 2015	Member, Editorial Board, BrainFacts.org
2010 - 2014	Editor, Current Opinion in Neurobiology
	Member, European Dana Alliance for Brain Research (EAN)
2005 - 2006	Chairperson, Programme Committee, Federation of European Neuroscience Societies (FENS)
2002 - 2012	Member, Board of Directors, Centre of Excellence, Ministry of Education and Research, Norway
	Member, Editorial Boards: Hippocampus, Faculty of 1000, Neuron, Learning and Memory, F1000 Research

Project Coordination, Membership in Collaborative Research Projects

since 2023	Centre of Excellence, Norwegian Research Council, Norway

since 2021	Founding Vice Director, Synergy Grant “Centre for Algorithms in the Cortex” at the Hebrew University of Jerusalem, Jerusalem, Israel, ERC
2014 - 2019	Principal Investigator, Advanced Grant “GRIDCODE – Cortical maps for space”, 7th Research Framework Programme (FRP), ERC
2013 - 2015	Coordinator, Project, “ICT Future Emerging Technologies”, 7th FRP, ERC
2009 - 2013	Principal Investigator, Advanced Grant “CIRCUIT – Neural circuits for space representation in the mammalian cortex”, 7th FRP, ERC
2008 - 2012	Project “HEALTH-2007-2.2.1-2: Coding in neuronal assemblies”, 7th FRP, ERC
2000 - 2003	Coordinator, Project “Quality of Life and Management of Living Resources Work Program / Research and technological development activities of a generic nature”, 5th FRP, ERC

Honours and Awarded Memberships

since 2023	Foreign Member, Royal Society, UK
2021	Honorary Fellow, Royal Institute of Navigation, UK
2020	Gunnerus Medal, Royal Norwegian Society of Sciences and Letters, Norwegen
2018	Grand Cross, Royal Norwegian Order of Saint Olav, Norway
since 2016	Member, National Academy of Medicine, USA
since 2016	Member, German National Academy of Sciences Leopoldina, Germany
since 2015	Member, National Academy of Science, USA
since 2015	Member, American Philosophical Society, USA
2014	Nobel Prize in Physiology or Medicine (together with May-Britt Moser and John O’Keefe), Nobel Assembly at Karolinska Institutet, Stockholm, Sweden
2014	Karl Spencer Lashley Award, American Philosophical Society, USA
2013	Fridtjof Nansen Award of Outstanding Research in Science and Medicine, Norwegian Academy of Science, Norway
2013	Louisa Gross Horwitz Prize for Biology or Biochemistry, Columbia University, New York City, USA
2013	Perl-UNC Neuroscience Prize, University of North Carolina, Chapel Hill, USA
2012	Elected Councilor, Society for Neuroscience, Washington D.C., USA
2011	Louis-Jeantet Prize for Medicine, Louis-Jeantet Foundation, Geneva, Switzerland
2011	Member, American Association for the Advancement of Science (AAAS), USA

2011	Anders Jahre Senior Medical Prize, UiO, Oslo, Norway
since 2011	Member, European Molecular Biology Organization (EMBO)
since 2011	Member, Academia Europaea
since 2010	Member, Norwegian Academy of Technological Sciences (NTVA), Norway
2008	Eric K. Fernström Prize, Karolinska Institute, Solna, Sweden
2006	Betty and David Koetser Award for Brain Research, Betty and David Koetser Foundation for Brain Research, Zurich, Switzerland
2006	Liliane Bettencourt Prize for Life Sciences, Bettencourt Schueller Foundation, Paris, France
2005	W. Alden Spencer Prize, Columbia University, New York City, USA
since 2004	Member, Norwegian Academy of Science and Letters (DNVA), Norway
since 2003	Member, Royal Norwegian Society of Sciences and Letters (DKNVS), Norway
1999	Scientific Annual Prize, DKNVS, Norway

Research Priorities

Edvard Moser is a neuroscientist. He is known for his work on spatial orientation and spatial memory. Together with May-Britt Moser he discovered a type of brain cell (grid cells) that enables precise orientation in space. This made it possible to demonstrate thinking capacity at a neuronal level for the first time. For the discovery of grid cells Edvard Moser and May-Britt Moser received the Nobel Prize in Physiology or Medicine in 2014, together with John O'Keefe.

Edvard Moser researches how mammals orientate themselves in spaces. He studies the neural network computations within the brain's cortex, for which thousands of distinct neurons work together. Together with May-Britt Moser he discovered previously unknown nerve cells in the brains of rats that work like a natural navigation system. The "grid cells" place a virtual coordinate grid of hexagons over the perceived environment. By means of this grid the brain can calculate its position in space. This is the first time that the two researchers have been able to demonstrate thinking capacity at a neuronal level. In further studies they also identified "border cells". These become active when animals approach obstacles and walls.

Edvard and May-Britt Moser have thus explained essential principles of the orientation system in rodents. The grid and border cells they discovered are involved in interaction with other cells. These include head-direction cells and place cells, which send signals when an animal passes known locations and landmarks. Together, the cell types are assumed to create a kind of map of the spatial environment. In more recent studies, they have also discovered cells that indicate walking speed, known as speed cells. For this they investigated the brain activity of rats at different walking speeds. As speed increases the speed cells become more active.

Edvard Moser and May-Britt Moser received the Nobel Prize in Physiology or Medicine in 2014 for the discovery of grid cells. They share the award with the British-US neuroscientist John O'Keefe, who identified the brain's place cells. The results of research by Edvard Moser and May-Britt Moser could advance research into Alzheimer's disease. The areas of the brain relating to orientation are the first to be affected by Alzheimer's disease. Patients lose their ability to orient themselves first. When we understand on which neuronal basis spatial orientation takes place, new approaches to therapy can be developed on this basis.

Previous research has been focused on the conversion of visual and auditory stimuli into active patterns in the brain. These findings are limited to the first stages of sensory perception. How information is transferred at a higher level is subject to other processes and is still to be thoroughly unstood. Deciphering the coding of this information transfer is the focus of Edvard Moser's current research.